100377

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
841 Chestnut Building
Philadelphia, Pennsylvania 19107

SUBJECT: Standard Chlorine: Issues DATE: 6-11-93

FROM: Robert S. Davis, Coordinator (3HW13)
Biological Technical Assistance Group

TO: Katherine Lose, RPM (3HW42)
Delaware/Maryland Section

&

Peter Knight, CRC (3HW02)
NOAA

Attached are some notes from memos over the past year or so related to the clean up at Standard Chlorine. The main issues are target clean up numbers, extent of clean up (acreage and jurisdiction of responsibilities between Standard Chlorine and Occidental), and calculation of hazard used in the ecological Risk assessment.

While we initially agreed upon using the 33 mg/kg in sediment for the proposed areal extent of clean up, some question exists over the different contaminant concentration numbers reported and used and appearing in the documents reviewed to date. We have to come to an understanding both within our agencies and with the State as well as the PRP regarding the target clean up number(s).

Along with this, we should resolve issues surrounding what needs to be done in the Remedial Design and those item that can be left for the five year review. As stated last week, we need to resolve these ASAP.

Please use the attached notes as a point of departure for discussions and a meeting that we should set up also ASAP.

If you have any questions that should be resolved about the notes prior to a formal meeting please feel free to contact me.

- NOTES -

Standard Chlorine:

Issues to be resolved: (information abstracted from te letters and memos attached.)

1) Inconsistency between 10/26/92 and 4/5/93 letters. In the 10/26/92 letter, the opinion appears to be that the extent of contamination and its severity does not warrant extensive cleanup because of the potential for impacts to the various habitats. Additional evaluation of habitat and contaminant removal should be carried out in relation to hotspots to maximize cleanup and minimize habitat losses. The 4/5/93 letter seems to suggest that remediation over a larger area may be needed.

The trouble may be in the documents reviewed to date. Both the RI and the FS present conflicting information. For example, Table 6-95 or the RI showed a concentration of 543 mg/kg of TCB in undiluted sediment, but Table 2-8 of the FS shows 469 mg/kg in sediment while duplicate from the same location showed only 33 mg/kg. In addition, analytical results were not validated for 100% of the samples.

2 A change in the target numbers appears to be the aim of some of the discussions surrounding LOECs and AETs in the letter of 4/5/93. Uncertainty in the analytical work discussed above has led to the conservative conclusion on NOAA's part that the LOEC may be 8.3 mg/kg rather than 33 mg/kg that we have been relying upon to this point. We have been agreeable up to this point on the 33 mg/kg clean up target and have even agreed to the 68 mg/kg number because it has been purported to roughly conform to the same 'footprint' of area that the 33 mg/kg area would cover if it were to be the cleanup target.

Unfortunately, the confusion over analytical data in the face of the AET/LOEC numbers leaves sufficient question to request additional work. This work may fit into the remedial design.

a) The unnamed tributary is an unresolved issue with regard for its relationship with soil piles and runoff areas (see NOAA letters on the RI and the ERA).

b) The seeps located on the surrounding hillsides should be characterized and their relation to downgradient resources evaluated.

c) The barren areas in the wetlands should be included in the RD as well as in the long-term monitoring if found to show elevated levels of contaminants. A limited number should be monitored into the distant future even

if not found to show contaminant so that 'pockets' of contaminants heretofore unknown are not missed and their impacts are properly attributed.

d) Fish tissue data also presents a confusing picture. We recommend continuing whole fish tissue sampling, using either resident fish or caged specimens. Resident fish would be preferable. Initially, a statistical comparison of data from the past efforts should be carried out.

e) Confusion also exists regarding the divided responsibilities between Standard Chlorine and Occidental (the next facility downstream). Trustee concerns over that portion of the creek above the tidegate, but downstream of the dividing line as well as beyond the tide gate are relevant. They revolve mainly around the contaminant level in the sediment and meeting the AWQC number of 50 ug/l.

   Issues regarding divided responsibilities for the whole area should be resolved through coordinated negotiations with all parties, included state, federal, and local representatives (including trustees) as well as PRPs.

f) Future calculation of hazard should be based upon maximum values rather than the 95% UL. Representatives of Standard Chlorine verbally agreed to do this, but failed to carry it through in the ecological risk assessment. We can agree to the 95% UL in the future if sufficient sampling is carried out to render enough points to run complete statistical analyses.

g) Sediment and aquatic bioassays should be continued periodically throughout the RD and the monitoring phases. The cleanup levels targeted at this point may not be protective of aquatic or benthic organisms.

To meet the short term goals, it is suggested that the PRP be required to clear up those statistical and data problems identified in the past review comments as well as those emphasized above. The PRP should also agree to carefully prepare and present for review a long-term monitoring plan at the same time that he submits the remedial design work plan. The remedial design and work plan the long-term monitoring plan should be focused not only upon the cleanup alternative selected from the FS but also upon clearing up the contaminant picture (extent of contamination and levels) that remains so confusing to date.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

SUBJECT: Standard Chlorine: FS **DATE:** 4-14-93
FROM: Robert S. Davis, Coordinator (3HW13)
TO: Katherine Lose, RPM (3HW42)

The BTAG has reviewed the subject document and offers the following comments for your use, on behalf of NOAA, FWS, and EPA BTAG members.

The remedial goals for ground water and surface water may provide protection for ecological resources, although uncertainty exists because of the limited toxicity database for chlorobenzenes.

Soils/sediment response levels were chosen to represent a contaminant concentration above which remedial action may be required. The risk-based response level for on-site surface soils was 625 mg/kg of total chlorinated benzenes (TCBs). The Lowest Observed Effects Level (LOEL) for soil flora, 33 mg/kg, was used as a response level for ecological receptors in off-site soils and sediments. This LOEL was calculated from the results of lettuce seed toxicity tests conducted during the RI. The response level for off-site sediments is high compared to the Apparent Effects Threshold (AET) concentrations for 1.2.4-trichlorobenzene, which range from 0.031 to 0.064 mg/kg. In light of this, we suggest long-term monitoring of soils and sediments both for contaminant levels as well as biological responses. We further suggest that the PRP and his investigation develop a biology-based plan for this monitoring that includes both flora and fauna. In the past, we suggested that black birds be used. With regard to plants, we would be pleased to participate in developing a plan.

The remedial action objectives would be met to varying degrees by Alternatives 3, 4, and 5. However, the remedial action objectives may not be protective of aquatic resources because the response level (33 mg/kg TCBs) used for sediment remediation is high compared to the AET concentration for 1.2.4-trichlorobenzene.

Although site-specific sediment toxicity tests were conducted to help in determining target cleanup concentrations for the protection of aquatic resources, there are some concerns about the interpretation of these test results. An LC50 toxicity test was conducted during the remedial investigation using Hyalella azteca. The LC50 for TCBs was determined to be 446 mg/kg, and the lowest observed effects concentration (LOEC) was 136 mg/kg. To conduct the test, sediment from the site was mixed with clean control sediment to create a series of concentrations of total chlorinated benzenes representing a 100%, 50%, 25%, 12.5%, and 3.25% mixture, in addition to a control. Table 6-95 in the RI Report showed that the concentration of TCBs in the undiluted sediment sample (100%) was 543 mg/kg. This value contradicts the data summary table (Table 2-8), which shows that concentrations

of TCBs in the sediment sample used for the LC50 test (SSC-20-B) were 469 mg/kg. In addition, the analytical results were not validated: a duplicate sediment sample from the same location (SSC-20) contained only 33 mg/kg of TCBs. Because of the uncertainty in the actual concentrations of contaminants in the sediment sample, the results of the LC50 test should also be considered uncertain. If sample SSC-20 more accurately reflects the analytical characteristics of the sediment at that location, the LOEC (observed in the 25% mixture) would be as low as 8.3 mg/kg.

In addition to the 50 test, Hyallela growth and survival bioassays were conducted. In these tests, percent survival was significantly different from the control in a sediment sample (SDT-6) containing only 1.7 mg/kg of TCBs. These results, along with the concerns mentioned above, suggest that the response level for sediments of 33 mg/kg may not be protective of aquatic resources.

The proposed remedial alternatives presented in the Feasibility Study should be considered primarily source control measures, because they do not include remediation of most of the sediments in Red Lion Creek. Red Lion Creek contains widespread areas of sediments that contain concentrations of TCBs that are above the AET concentrations. Sediments collected from the farthest downstream areas sampled - between Route 9 the tide gate - contained concentrations of 1.2.4-trichlorobenzene ranging from 0.38 to 9.0 mg/kg, approximately 10 to 300 times the lowest AET concentration. The concentration of TCBs above which remediation may be required was 33 mg/kg, 200 to 1,000 times greater than the AETs for various chlorinated benzene compounds. Data on TCB toxicity indicate that the response level of 33 mg/kg may not be protective of aquatic resources.

Delaware River resources are currently restricted from access to Red Lion Creek because of the tide gate. However, future plans may involve the construction of fish passage facilities, in which case the remedial alternatives proposed here may not protect these resources. Even if fish passage facilities are not constructed, aquatic resources downstream from the tide gate may be at risk from the presence of contaminated sediments (it is not known if they are contaminated; no analyses have been conducted), or from future transport of contaminated sediments downstream during high flow conditions. Also the tide gate should not be viewed as a protective barrier to keep environmental resources from contaminated areas.

Extensive sampling has been conducted in Red Lion Creek immediately downstream from the Standard Chlorine site, and the extent of contamination has been well defined in that area. However, only limited sampling of sediments has been conducted between Route 9 and the tide gate, and no sampling has been conducted downstream from the tide gate. Further studies should be conducted to determine extent of contamination downstream of Route 9 including the tide gate in the Delaware River. The

administrative division of this site and the adjacent one down stream notwithstanding, it is suggested that continued chemical and biological monitoring of the area down to the tide gate be instituted.

The data management approaches used by the investigator has resulted in a very cloudy picture. At this point, it is not certain that the cleanup target of 33 mg/kg for sediment will even marginally protect environmental resources. In the interest of continuing the project, we suggest that the grid approach to sampling used to this point be continued. Chemical/biological monitoring should be intensified during remedial design and continued as part of the long-term monitoring activities. The plan should include flora and fauna and supplemental sediment toxicity testing. Gaps in the ecological risk assessment still outstanding should be used as a point of departure in designing the long-term monitoring plan.

Thanks for the opportunity to comment, and if you have any questions contact Bob Davis on X3155. If you want to use these comments directly or edit them into the official letter, I will be glad to discuss any issues that are unclear and even concur on your letter if you wish. In any case, feedback from the RPM is important to the efforts of the BTAG, and I would like to hear from you regarding the usefulness of these comments.

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Ocean Service
Office of Oceanography and Marine Assessment
Ocean Assessments Division
Hazardous Materials Response Branch
7600 Sand Point Way NE, BIN C15700
Seattle, Washington 98115

April 5, 1993

Mr. Robert S. Davis (3HW15)
BTAG Coordinator
EPA - Region III
841 Chestnut Street
Philadelphia, PA 19107

RE: Standard Chlorine

Dear Mr. Davis:

Thank you for the opportunity to provide comments on the Feasibility Study for the Standard Chlorine of Delaware, Inc. Site of Delaware City, Delaware.. The following comments are made on behalf of the National Oceanic and Atmospheric Administration (NOAA).

The remedial goals for ground water and surface water may provide protection for NOAA trust resources, although uncertainty exists because of the limited toxicity database for chlorobenzenes.

Soils/sediment response levels were chosen to represent a contaminant concentration above which remedial action may be required. The risk-based response level for on-site surface soils was 625 mg/kg of total chlorinated benzenes (TCBs). The Lowest Observed Effects Level (LOEL) for soil flora, 33 mg/kg, was used as a response level for ecological receptors in off-site soils and sediments. This LOEL was calculated from the results of lettuce seed toxicity tests conducted during the RI. The response level for off-site sediments is high compared to the Apparent Effects Threshold (AET) concentrations for 1,2,4-trichlorobenzene, which range from 0.031 to 0.064 mg/kg.

The remedial action objectives would be met to varying degrees by Alternatives 3, 4, and 5. However, the remedial action objectives may not be protective of aquatic resources because the response level (33 mg/kg TCBs) used for sediment remediation is high compared to the AET concentration for 1,2,4-trichlorobenzene.

Although site-specific sediment toxicity tests were conducted to help in determining target cleanup concentrations for the protection of aquatic resources, there are some concerns about the interpretation of these test results. An LC_{50} toxicity test was conducted during the remedial investigation using *Hyallela azteca*. The LC_{50} for TCBs was determined to be 446 mg/kg, and the lowest observed effects concentration (LOEC) was 136 mg/kg. To conduct the test, sediment from the site was mixed with clean control sediment to create a series of concentrations of total chlorinated benzenes representing a 100%, 50%, 25%, 12.5%, and 3.25% mixture, in addition to a control. Table 6-95 in the RI Report showed that the concentration of TCBs in the undiluted sediment sample (100%) was 543 mg/kg. This value contradicts the data summary table (Table 2-8), which shows that concentrations of TCBs in the sediment sample used for the LC_{50} test (SSC-20-B) were 469 mg/kg. In addition, the analytical results were not validated: a duplicate sediment sample from the same location (SSC-20) contained only 33 mg/kg of TCBs. Because of the uncertainty in the actual concentrations of contaminants in the sediment sample, the results of the LC_{50} test should also be considered uncertain. If sample SSC-20 more accurately reflects the

analytical characteristics of the sediment at that location, the LOEC (observed in the 25% mixture) would be as low as 8.3 mg/kg.

In addition to the LC_{50} test, Hyallela growth and survival bioassays were conducted. In these tests, percent survival was significantly different from the control in a sediment sample (SDT-6) containing only 1.7 mg/kg of TCBs. These results, along with the concerns mentioned above, suggest that the response level for sediments of 33 mg/kg may not be protective of aquatic resources.

The proposed remedial alternatives presented in the Feasibility Study should be considered primarily source control measures, because they do not include remediation of most of the sediments in Red Lion Creek. Red Lion Creek contains widespread areas of sediments that contain concentrations of TCBs that are above the AET concentrations. Sediments collected from the farthest downstream areas sampled – between Route 9 the tide gate – contained concentrations of 1,2,4-trichlorobenzene ranging from 0.38 to 9.0 mg/kg, approximately 10 to 300 times the lowest AET concentration. The concentration of TCBs above which remediation may be required was 33 mg/kg, 200 to 1,000 times greater than the AETs for various chlorinated benzene compounds. Data on TCB toxicity indicate that the response level of 33 mg/kg will not be protective of aquatic resources.

Delaware River resources are currently restricted from access to Red Lion Creek because of the tide gate. However, future plans may involve the construction of fish passage facilities, in which case the remedial alternatives proposed here may not protect these resources. Even if fish passage facilities are not constructed, aquatic resources downstream from the tide gate may be at risk from the presence of contaminated sediments (it is not known if they are contaminated; no analyses have been conducted), or from future transport of contaminated sediments downstream during high flow conditions. Also the tide gate should not be viewed as a protective barrier to keep environmental resources from contaminated areas.

Extensive sampling has been conducted in Red Lion Creek immediately downstream from the Standard Chlorine site, and the extent of contamination has been well defined in that area. However, only limited sampling of sediments has been conducted between Route 9 and the tide gate, and no sampling has been conducted downstream from the tide gate. Further studies should be conducted to determine extent of contamination downstream of Route 9 including the tide gate in the Delaware River.

NOAA's concerns regarding the methods and conclusions of the ecological risk assessment were expressed in a memo to the BTAG Coordinator dated 2/6/92. These concerns still need to be addressed for an adequate assessment of the risk posed to environmental receptors, including NOAA trust resources. Remedial alternatives could subsequently be developed for sediments in Red Lion Creek based upon conclusions from the risk assessment.

If you have any questions, please contact me at (215) 597-3168.

Sincerely,

Sean P Morrison.

Sean P. Morrison
NOAA - Assistant Coastal Resource Coordinator

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Ocean Service
Office of Ocean Resources Conservation and Assessment
Hazardous Materials Response and Assessment Division
Coastal Resources Coordination Branch

October 26, 1992

Mr. Robert S. Davis (3HW15)
BTAG Coordinator
EPA - Region III
841 Chestnut Street
Philadelphia, PA 19107

RE: Standard Chlorine
Remedial Investigation Report (RI)

Dear Mr. Davis

Thank you for the opportunity to provide comments on the RI for the Standard Chlorine of Delaware, Inc. Site. The following comments are made on behalf of the National Oceanic and Atmospheric Administration (NOAA).

The final RI addressed only 5 of the 14 comments that were made regarding the draft RI in a memorandum from NOAA to the BTAG Coordinator dated 2/6/92; the changes that were made in regard to the comments were of a superficial nature. The final RI did not address most of the important areas of concern to NOAA that were presented in the memo, and the document was still lacking in an adequate evaluation and discussion of potential impacts from site-related contaminants to aquatic receptors and their supporting habitats.

The following focuses on how the specific comments from NOAAs 2/6/92 memo (attached) were addressed in the final RI.

Comments 1 and 2: These comments were not addressed. The final RI included no additional discussion of contamination in the unnamed tributary in relation to the soil piles and runoff areas. The final RI retained its conclusion regarding the effectiveness of the remediation program and did not consider other possible active sources of contamination to the unnamed tributary.

Comment 3: The second sentence in the first paragraph of Section 4.2.1.1 in the RI was revised to include the unnamed tributary along with Red Lion Creek as the direction towards which ground water flows. However, no direct mention was made of the ground water seeps emerging from the hillsides surrounding the tributary.

Comment 4: A paragraph was added to the RI that described areas within the wetland that were devoid of vegetation. Although one of these areas was originally impacted by sediment removal actions, it was an area containing relatively high concentrations of chlorobenzene in sediment.

Comment 5: The final RI included a table (Table 5-3) containing the analytical data from the 1990 fish sampling. However, there was no discussion in the document regarding the differences in concentrations of chlorobenzenes in fish tissue from the 1986 and 1990 data in comparison to the 1991 data. NOAA recommended this issue be discussed.

Comment 6: This comment was not addressed in the Ecological Assessment. The paragraph that was added to the RI to address Comment 4 (page 5-2, paragraph 4) suggested the lack of vegetation in some areas of the tributary wetlands may be due to high concentrations of chlorobenzene in sediment. This possibility should be directly addressed, and contaminant concentrations in sediment should be examined in areas that are devoid of vegetation.

Comment 7: This comment stated that the area located between Route 9 and the tide gate needs to be addressed at some point. The draft RI reported that the Delaware Department of Natural Resources and Environmental Control (DNREC) and the EPA agreed that the eastern boundary for the RI/FS would be Route 9 because the area to the east of Route 9 would be addressed in relation to the adjacent Occidental Chemical site. The final RI adds that the DNREC reserved the right to require the conduct and documentation of RI activities east of Route 9 since the RCRA program underway at the Occidental Chemical facility might not address contamination in this area. The RI activities conducted at this downstream area east of Route 9 need to be reviewed to ensure that they will provide adequate data for an evaluation of the potential impact of Standard Chlorine site-related contaminants on aquatic resources in the Delaware River.

Comment 8: This comment was not addressed; toxicity tests were not discussed in the Ecological Assessment section.

Comment 9: This comment was not addressed. The Ecological Risk Assessment used the upper 95% confidence limit on the arithmetic mean to estimate the reasonable maximum exposure concentration. As discussed in the memorandum, an agreement had been made that the Ecological Risk Assessment would include consideration of a maximum worst case scenario using absolute maximum concentrations, with the exception of browsing organisms whose home range could cover a fairly extensive area. In the final version of the Work Plan for the Baseline Risk Assessment (Attachment II), it was stated that 95% confidence limits would be used for exposure estimates except in the case of the restrictive mobility of organisms, where maximum concentrations would be used. However, this exception was not stated in the text of the Ecological Risk Assessment of the final RI, and only the upper 95% confidence limit was used for calculating hazard indices for aquatic life. The Ecological Risk Assessment did not interpret the significance of the results of the toxicity tests or of the whole body fish tissue analyses.

Comment 10: The final RI included the statement "Only chlorobenzene exceeded a hazard index of one." These hazard indices were calculated using the upper 95% confidence limits rather than the maximum concentrations.

Comments 11, 12 and 13: These comments regarding the conclusions were not addressed in the final RI. The RI still needs to include an interpretation of the sediment toxicity tests in relation to community level effects. In addition, the fish tissue data should be interpreted using the entire data set, which includes samples collected in March 1990.

Comment 14: Appendices J and K remained unchanged. As commented previously, it does not appear that data from all of the sediment toxicity sampling locations were presented in these appendices.

Clean Up Goals

Applied Water Quality Criteria (AWQC), Sediment Quality Criteria and Effective Range-Low (ER-L) concentrations have not been established for benzene or the chlorobenzenes, so the Lowest Observed Effect Levels (LOEL) and Apparent Effects Threshold (AET) concentrations should be used as guidelines for clean-up of ground water and sediments. The ground water data should be compared with LOELs, and the sediment data should be compared with AET values.

To be protective of environmental receptors, concentrations of contaminants in surface water and ground water should not exceed their applicable LOELs at the discharge point to resource habitats. Estimating these concentrations would be based on the demonstrated ground water flow and hence may require additional investigations or modeling. Ground water samples that were collected from on-site locations and analyzed as part of the RI contained maximum concentrations of benzene, monochlorobenzene, two dichlorobenzenes (DCBs), two trichlorobenzenes (TCBs), and two tetrachlorobenzenes (TeCBs) that exceeded their respective chronic LOELs by at least ten times. Ground water moves in a northerly direction from the site at approximately 128 feet per year and appears to be a likely source of contamination to Red Lion Creek and the unnamed tributary. The ground water seeps that have been observed emerging from hill slopes surrounding the tributary may be releasing contaminated ground water and should be analyzed to evaluate this potential source of contamination. Ground water remediation, with LOELs as clean up guidelines, should be conducted to reduce contamination in ground water to concentrations that will present no threat to aquatic organisms and associated habitats.

Benzene and chlorinated benzenes were detected in sediment collected from the tributary and Red Lion Creek at concentrations that far exceeded their relative maximum AET concentrations for the compounds for which AETs were available. Concentrations of 1,2,4-trichlorobenzene exceeded the maximum AET in 51 of 52 sediment samples collected from the unnamed tributary, and in 63 of 67 sediment samples collected from Red Lion Creek. The PCB Aroclor 1260 was detected in sediment from the tributary at a maximum concentration that exceeded the ER-L for total PCBs. Clean up of sediment in the tributary and Red Lion Creek to AET concentrations would provide protection to aquatic resources. However, because the extent of contamination of the creek and wetlands is so great, the removal of contaminated sediments using AETs as clean up goals might destroy important habitats. In this situation, it may be more desirable to set remediation goals that would remove the greatest mass of contamination at minimal habitat loss, rather than attempt to clean up all sediments to a specified contaminant concentration. An additional evaluation of the important habitats in relation to the hot spots of contamination would allow for a balance between maximum clean up and habitat protection. Results from the RI report indicate that the most contaminated sediments in the tributary lie below the soil dike structure that was built to control the waste spill. Two of the sediment samples collected from the Red Lion Creek at the base of the tributary were far more contaminated than the rest of the samples. An effort to focus clean up on the most contaminated sediments in the tributary and leave other areas relatively undisturbed might prove to be the most beneficial action to protect aquatic resources. However, an additional investigation of habitat in the creeks and wetlands should be conducted before any recommendations are made.

If you have any questions, please contact me at (215) 597-3168.

Sincerely,

Sean P Morrison

Sean P. Morrison
NOAA - Assistant Coastal Resource Coordinator

10/26/92 letter to Dave Hamm

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If you have any questions, please contact me at (215) 597-3168.

Sincerely,

Sean P Morrison

Sean P. Morrison
NOAA - Assistant Coastal Resource Coordinator

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Ocean Service
Office of Ocean Resources Conservation and Assessment
Hazardous Materials Response and Assessment Division
Coastal Resources Coordination Branch

MEMORANDUM

TO: Bob Davis, BTAG Coordinator

FROM: Diane E. Wehner, NOAA CRC

SUBJECT: Standard Chlorine RI

DATE: February 6, 1992

Thank you for the opportunity to comment on the Remedial Investigation (RI) Report for the Standard Chlorine Site in Delaware City, DE. The following comments are submitted on behalf of the National Oceanic and Atmospheric Administration (NOAA) and focus specifically on areas of concern to aquatic receptors and their supporting habitats that are associated with the site.

General Comments

Though there appears to have been quite a bit of data collected during this RI effort, the RI overall, does a very poor job in presenting and interpreting the data.. Much of the data is hidden in appendices with only a brief reference made to them in the body of the report. Other data (e.g., some of the fish tissue data) seems to have been omitted altogether. As a result, it is difficult to discern what the full scope of impacts to the environment associated with this site are.

Specific Comments

1. Page 2-30, Paragraph 2: A discussion of the levels of contamination in the tributary in relation to the soil piles and runoff areas should be included. Without this analysis, it is difficult to determine whether the levels observed in the tributary are the result of surface runoff, groundwater discharge or residual from the 1986 spill. This information on possible sources will be essential to developing any remedial alternatives at this site.

2. Page 2-54, Paragraph 2: I don't think all possible migration pathways have been considered in order to conclude, as this paragraph does, that " The sediment quality data [in the tributary] indicates that the remediation program north of the soil dike was less effective in removing released product than the removal program implemented upstream of the dike due to the tidal effect." This assumes there are no other active sources that continue to supply contaminants to this area.

3. Page 4-5, Section 4.2.1.1: The RI states the groundwater flow within the Columbia Formation is predominantly to the north towards Red Lion Creek. A discussion of the groundwater source of "several seeps emerging from the surrounding hillsides" in the southern section of the wetland in the unnamed tributary (noted on page 5-2, Paragraph 2) should also be included.

4. Page 5-1 and 5-2, Section 5.2: The description of the wetlands in the unnamed tributary fails to note certain areas are devoid of vegetation (e.g., the area to the north of the soil dike.)

5. Page 5-10, Table 5-2: It appears that not all of the analytical results for the fish tissue sampling have been reported. In the Organic Data Validation Package (submitted October 1990) for two fish tissue samples collected on March 5, 1990, a maximum value for 1,4 dichlorobenzene was reported as 4000 ug/kg, a maximum value for 1,2,4-trichlorobenzene was reported as 7100 ug/kg. Total reported values for semi-volatiles ranged from 9620 ug/kg to 19170 ug/kg. These values are above those reported in the RI. When one compared the 1990 data to fish tissue data collected in 1986 from Red Lion Creek, the concentrations of chlorinated benzenes in tissue samples were found to be similar. As concentrations of chlorobenzenes in the water column decrease, rapid elimination of the chlorobenzenes in the tissues should occur. Chlorobenzenes are metabolized in fish within a period of days (1-50 days depending on the degree of chlorination). Because the 1990 data indicate that concentrations in the tissues are similar, it can be concluded that there has been little, if any, decline in the concentrations of chlorobenzenes available to the biota in Red Lion Creek. These data need to be included and this issue needs to be discussed in the RI.

6. Page 5-13, Paragraph 1: The Ecological Assessment (EA) concludes that several large non-vegetated areas observed in Area 1 (located to the west of the Standard Chlorine plant) are remnants of the removal actions undertaken at the site. An evaluation of contaminant concentrations in these areas should also be conducted to see if the area may be devoid of vegetation due to the presence of heavily contaminated sediments.

7. Page 5-16, Area 3 (located between Rt. 9 and the tide gate). This area needs to be addressed at some point in time since it appears, based on my cursory review of the sediment data for this area, that site related contamination is present in this area and possibly may be impacting the Delaware River. I understand that this area was not included in the EA, as per an agreement with EPA and the State, because it was thought that this area would be addressed under activities ongoing in the RCRA program that pertain to the adjacent property at Occidental Chemical (formerly Diamond Shamrock). The BTAG should have the opportunity to review any of the data that has been collected or will be collected in this area that pertain to ecological risk concerns.

8. Section 5.4, Ecological Assessment: No discussion of the toxicity tests conducted on sediment or soils is included in this section. Though some of these data appear to be found in Appendix J and K, a discussion of the significance of the results should be included, at a minimum, in this section and the following section on the Baseline Risk Assessment.. The same applies to the whole-body fish tissue data.

9. Page 6-12 and 6-13, Calculation of the Average Concentration and the Upper 95% Confidence Limit: At the meeting I attended on April 30, 1991 with Standard Chlorine, it was specifically agreed that the ecological risk assessment would include consideration of a maximum worst case scenario using absolute maximum values observed for various media. The only exception discussed was that for browsing organisms whose home range could cover a fairly extensive area. The language in the workplan for the risk assessment was obviously not changed as per this agreement. This approach was recommended as being especially relevant to some of the more sessile aquatic receptors to allow for the identification of any areas that may not require extensive but rather hot-spot remediation. This issue becomes somewhat of a moot point when one looks at the risk assessment presented in this RI on the wetland/aquatic habitat. As noted in comment #8, not only were the results of the toxicity test and whole body fish tissue analyses not discussed in the ecological assessment section (5.4),

they were not included in the baseline risk assessment section (6.4.3.3.2) for the applicable habitats either. Section 6.4.4.2 (Page 6-183) which discusses toxicity to aquatic life notes toxicity tests were conducted but provides no interpretation of their significance. No reference is made to the fish tissue data at all in this section. It would seem to me that it would have been appropriate to identify fish as one of the target species for the risk assessment.

10. Page 6-192, Section 6.4.5.3: The Risk Characterization for Aquatic Life should discuss the individual hazard indices for those contaminants that exceeded the applicable criteria. Instead, only a cumulative hazard index is discussed in the text. Information on which contaminant specific criteria has been exceeded will be important as target clean-up levels may need to be established on a contaminant specific basis.

11. Page 7-6, Section 7.4, Conclusions - Sediments: No mention of the sediment toxicity tests is included in this section. The comment made regarding the source of the elevated levels of site-specific contamination between the soil dike and the silt fence may not be justified (see Comment #2 above).

12. Page 7-7, Section 7.6, Conclusions - Fish Sampling: The conclusions drawn here may not be valid since all the fish tissue data have not been included (see Comment #5 above). For example, this section notes fish tissue samples collected in Red Lion Creek near the Route 9 bridge showed total concentrations of less than 1.5 mg/kg.

13. Page 7-13, Section 7.7.2, Conclusions - Ecological Risk Assessment: This section will need to be revised based upon the comments noted above. Though the potential for adverse chronic effects to occur to the aquatic life of Red Lion Creek and its tributaries due to chlorobenzene concentrations in surface water and sediments is acknowledged (based on the fact that surface water concentrations exceeded AWQC and that sediments concentrations exceeded the LC50 concentrations determined in the sediment toxicity tests), no attempt has been made to try to determine what those effects could be. Some interpretation of what these indicators mean on a community level needs to be evaluated before any consideration of a remedy can be made.

14. Appendix J and K: Appendix J (Sediment Toxicity Test Results) includes the results of a toxicity test conducted on only one sediment sample (SSC-20-B). Appendix K (Soil Toxicity Test Results) includes the results of the soil toxicity tests and what appears to be some of the sediment toxicity test results. The number of sediment samples that toxicity test results are presented for , however, does not appear to match up with all of the sediment toxicity sampling locations noted in Figures 2-10 and 2-11.

Please contact me a 597-3636 should you have any questions concerning these comments.

cc: Bob Guarni, EPA RPM

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
841 Chestnut Building
Philadelphia, Pennsylvania 19107

SUBJECT: Standard Chlorine: FS DATE: 4-14-93

FROM: Robert S. Davis, Coordinator (3HW13)
Biological Technical Assistance Group

TO: Katherine Lose, RPM (3HW42)

The BTAG has reviewed the subject document and offers the following comments for your use, on behalf of NOAA, FWS, and EPA BTAG members.

The remedial goals for ground water and surface water may provide protection for ecological resources, although uncertainty exists because of the limited toxicity database for chlorobenzenes.

Soils/sediment response levels were chosen to represent a contaminant concentration above which remedial action may be required. The risk-based response level for on-site surface soils was 625 mg/kg of total chlorinated benzenes (TCBs). The Lowest Observed Effects Level (LOEL) for soil flora, 33 mg/kg, was used as a response level for ecological receptors in off-site soils and sediments. This LOEL was calculated from the results of lettuce seed toxicity tests conducted during the RI. The response level for off-site sediments is high compared to the Apparent Effects Threshold (AET) concentrations for 1.2.4-trichlorobenzene, which range from 0.031 to 0.064 mg/kg. In light of this, we suggest long-term monitoring of soils and sediments both for contaminant levels as well as biological responses. We further suggest that the PRP and his investigation develop a biology-based plan for this monitoring that includes both flora and fauna. In the past, we suggested that black birds be used. With regard to plants, we would be pleased to participate in developing a plan.

The remedial action objectives would be met to varying degrees by Alternatives 3, 4, and 5. However, the remedial action objectives may not be protective of aquatic resources because the response level (33 mg/kg TCBs) used for sediment remediation is high compared to the AET concentration for 1.2.4-trichlorobenzene.

Although site-specific sediment toxicity tests were conducted to help in determining target cleanup concentrations for the protection of aquatic resources, there are some concerns about

during high flow conditions. Also the tide gate should not be viewed as a protective barrier to keep environmental resources from contaminated areas.

Extensive sampling has been conducted in Red Lion Creek immediately downstream from the Standard Chlorine site, and the extent of contamination has been well defined in that area. However, only limited sampling of sediments has been conducted between Route 9 and the tide gate, and no sampling has been conducted downstream from the tide gate. Further studies should be conducted to determine extent of contamination downstream of Route 9 including the tide gate in the Delaware River. The administrative division of this site and the adjacent one down stream notwithstanding, it is suggested that continued chemical and biological monitoring of the area down to the tide gate be instituted.

The data management approaches used by the investigator has resulted in a very cloudy picture. At this point, it is not certain that the cleanup target of 33 mg/kg for sediment will even marginally protect environmental resources. In the interest of continuing the project, we suggest that the grid approach to sampling used to this point be continued. Chemical/biological monitoring should be intensified during remedial design and continued as part of the long-term monitoring activities. The plan should include flora and fauna and supplemental sediment toxicity testing. Gaps in the ecological risk assessment still outstanding should be used as a point of departure in designing the long-term monitoring plan.

Thanks for the opportunity to comment, and if you have any questions contact Bob Davis on X3155. If you want to use these comments directly or edit them into the official letter, I will be glad to discuss any issues that are unclear and even concur on your letter if you wish. In any case, feedback from the RPM is important to the efforts of the BTAG, and I would like to hear from you regarding the usefulness of these comments.

From: Robert S. Davis (BDAVIS)
To: KLOSE
Date: Tuesday, December 8, 1992 3:07 pm
Subject: STANDARD CHLORINE

Kate:

Thanks very much for the meeting notes and your concern regarding the area that will be slated for clean-up using the 33 (LOEL). I am still waiting for the map that Anne Hiller promised months ago in a phone conversation. At that time she stated that the LOEL and the NOEL areas were virtually identical.

It is BTAG's concern that the remediation would be based solely upon human health as is demonstrated by Table 1 where it states that "the LOEL is most appropriate; the NOEL is too stringent (when compared to human risks)." This seems to state that hunman health is the sole reason for remediation and BTAG believes that this simply is not so. In addition, the levels for aquatic protection may be adjusted downward as a result as well.

It is our position that the most-stringent numbers should be used to protect ecological resources and we will stand fast on that until we are supplied with the information that shows clearly that the less-stringent number is sufficiently protective. It is possible that the map that Anne Hiller promised will demonstrate that our concerns will be alleviated by the remediation as it is currently planned. We need assurance that both the main areas of contamination as well as the 'hotspot' areas of contamination are remediated.

I note in your memo to the file that Weston claims to have based the ecological risk assessment on an organism more sensitive than the vole. To the best of my recollection, this is the first mention of that and it would be very interesting to BTAG to know what that organism is.

In summary, we have two requests:

1) assurance (either by a map or statement) that the most reasonably ecologically protective remediation plan will prevail.

2) the identity and rationale of using an animal more sensitive than the meadow vole for the ecological risk assessment.

Neither of these requests should delay the continuation of the project as they can both be included in the FS.

Again, thank you for sending the memo and if you have any questions, please feel free to contact me.

Bob

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
841 Chestnut Building
Philadelphia, Pennsylvania 19107

SUBJECT: Standard Chlorine: BTAG Comments on Final RI

DATE: 10-28-92

FROM: Robert S. Davis, Coordinator (HW13)
Biological Technical Assistance Group

TO: Katherine Lose, RPM (3HW42)
Delaware/ Maryland Section

The Remedial Investigation Report for the Standard Chlorine of Delaware site has been reviewed. In general, the document meets with our approval with the understanding that several items will be completed through the vehicles of an addendum letter to the RI (which can be prepared coincidentally with the FS), the Feasibility Study, and the Design Phase. Many of the BTAG comments of February 11, 1992 have not received the attention we would have liked; on the other hand, we are gratified to see that the investigator has carried out a risk assessment for the meadow vole. The conclusions in Section 7 which, for the most part, reflect the only correct conclusions that can be drawn from the facts and analyses presented in the document, are welcome. The Ecological Risk Assessment failed to consider all exposure routes for the Great Blue Heron and also grossly misinterpreted the cumulative hazard indices for aquatic species. Indices of 1.83 and 3.19 (see p 7-14) are not insignificant as implied in the report.

Although the RI and its preceding document, the draft RI, demonstrate that a lot of data have been collected, both documents do not present or interpret the information completely or objectively. Data in the appendices is often incomplete and generally only briefly referenced (if at all) in the main portions of the report. Due to this, it is still difficult to fully comprehend the extent of ecological damage. On the other hand, they have done a good job of calculating the risk to the small mammal ecological receptor population as requested and the results demonstrate a threat, but some areas require clarification in an addendum. These areas are identified below.

Specific comments are offered below for your use in completing this portion of the project. We do not believe any of these comments will delay the project since they can be dealt with as the feasibility study and design phases proceed.

HABITAT CHARACTERIZATION:

In our 2/11/92 memo we noted that full habitat characterization

is missing; it is still absent. For example, p 5-18 (Additional Site Reconnaissance) does not make any mention of the terrestrial setting. On page 5-15, the upland habitat is mentioned, but not sufficiently to fully picture the area. In addition, soils, sediment and aquatic descriptions should be expanded to detail the various types of habitats found. While it is not necessary to include complete habitat survey information, it would be useful to have similar detail to that used in characterizing the wetlands. It also appears that selection of reference areas, as suggested in that memo, has not been carried out.

PATHWAYS:

The RI has not completed the pathway characterization. For example, seeps along the unnamed tributary have not been included in the description of potential pathways to the tributary or to the Red Lion Creek. Other potential pathways are soil piles and runoff areas. The soils will remain of concern until they clarify the statement on p 2-69: "(t)he sediment quality data ... indicates that the remediation program north of the soil dike was less effective ... than the removal ... upstream of the dike due to tidal effect." In this first place, this assumes that no other sources will continue to actively supply contaminant to the system. It also seems to ignore the question of what effect the tide may have, i.e., in maintaining an equilibrium of contamination in the estuarine system. It is possible that the tide gate makes this a moot point, but such considerations should be part of the RI.

ECOLOGICAL RISK:

We commend the investigator for carrying out the appropriate ecological risk calculations and for arriving at the conclusion that ecological risk exists at the site. We believe they have understated the severity of risk by ignoring several species, which are eliminated from consideration due to the general lack of information available from the literature. It seems inconsistent that deer are included in light of this, but that small mammals caused a great deal of consternation. It would seem unusual that rats, a common laboratory animal, were not extensively used in testing the toxicity of the contaminants of concern and that the resulting data was unavailable from the literature for risk assessment. An apparent contradiction to this is found on page 6-194 where it states that Critical Toxicity Values (CTVs) were extrapolated from data on other mammalian species; no references are cited.

One exception is showing. Incorrect interpretation of the hazard index (HI), discussed on page 6-207, should include some discussion of the reasons for this poor ecological condition. It is possible that the spill has been the cause of it and as demonstrated by the low density, diversity, and abundance of

the fish collection effort that spanned an 8-day period in May of 1991. The HI's on this page (6-207) are sufficiently high for concern. Considering that a large number of contaminants are involved and that all but one presumably have an HI less than one, the HI for chlorobenzene must be very high. We do not agree with the statement that the cumulative HI barely exceeds one. It has always been our view that an HI exceeding one is high and at that level represents a serious potential for ecological risk.

The risk assessment for the Great Blue Heron still has not taken its full diet into consideration. As stated in Appendix I, this bird has a wide range of diet habits, from small amphibians and mammals through insects and fish. Elsewhere in the document, the risk potential to the meadow vole is calculated and the result is that a potential risk exists. The vole occupies the same habitat as many other animals in the menu of the Great Blue Heron (and probably represents an occasional meal). Due to this, it is concluded that the Great Blue Heron is also at risk from the contamination.

The risk assessment for the meadow vole (pp 6-204 & 7-14) correctly shows a potential for ecological risk. The vole is a food source of several predators and therefore represents an exposure pathway, therefore several other species are also at an unknown level of risk.

The lettuce germination toxicity test results show that germination is inhibited at the 100% level, indicating that plants are also at risk. Browsing animal (probably other than deer) are exposed through this route, but at an unknown level of risk. The earth worm toxicity tests (pp 6-220 & 7-15) substantiates this.

Toxicity tests on sediment (pp 6-209 & 7-15) show that organisms inhabiting this niche will be exposed and will be at risk. Since most of these organisms are of restricted mobility, a risk assessment of maximum possible dose should have been calculated, but it can be assumed that the risk potential is very high since survival at 100% concentration was only 33.3 % of the test organisms.

In conclusion, it is safe to say that the site poses a potential ecological threat to a wide range of species. Due to the unsuitability of the data found in the appendices (extraordinarily high detection limits and missing sheets), the most appropriate approach to use is the worst case scenario. In this situation, remediation would be very far reaching and extend well into the wetlands and well down Red Lion Creek. However, an alternative exists that is more attractive and that is to conceptualize design so that data gaps are filled. This is partially described below in the section on recommendations.

RECOMMENDATIONS:

The RI should be followed up by an addendum letter to cover several deficiencies listed below. This effort should not be used as an excuse to lengthen the term of the project, but rather to complete the administrative record. Many of our concerns can be formulated into the design phase.

The design phase should be conceptualized to fill gaps that may otherwise result in an incomplete remediation with regard to ecological risks. This is of particular concern in defining the boundaries of remediation. One approach involves an extension of the grid system used in the wetlands study to identify areas of contamination with more precision than is in hand at the moment. An alternative would be a map drawn to scale to represent the areas that would be remediated under the two scenarios resulting from the hazard calculations.

The investigator should prepare a draft design phase plan that includes a post-remediation monitoring plan, using the same as that used in the design phase. In this way, the success of remediation will have a analytical and statistical basis for long-term comparisons.

ADDENDUM:

We suggest the following for inclusion in an addendum letter to the Final RI.

With regard to contamination Chemistry, In our previous memo (Feb. 11, 1992 comments on the Draft RI), we raised questions regarding the use of data carrying qualifications (e.g., 'J': below detection limit) in the ecological assessment. Our comment was that no explanation was given as to why the high values were considered to be below detection limits. The only reason available is that ether insufficient sample was collected or that they experienced matrix interference. Both of these conditions should be corrected. The addendum should explain that this will be done that detection limits and methodologies to implement this suggestion are acceptable.

The data sheets for organic contaminants appears to be missing from Appendix A. Since the tables show extraordinarily high levels of organic contamination in soils and sediments, the investigator should include such information in the report so that the administrative record is complete.

The investigator should consider using LOELs or AETs in combination with water quality criteria as target clean up levels for aquatic and benthic receptors, as appropriate. This should be carried out at all discharge points and habitats in areas of

concern. This can also be carried out during the Feasibility Study, but the approach explained in the addendum. (This is the concept described in the second paragraph of **RECOMMENDATIONS**.

Other habitats than the wetlands and aquatic areas should be delineated. This should be done in the addendum letter so that the record associated with the RI is complete.

On page 6-152 (second bullet under Sect. 6.4.3), it is indicated that the intent was to identify receptor organisms, but no attempt appears to be made to link them to habitats. Our approach to risk assessment is integrated with habitats and the organisms found there. Without that information, our risk assessment assumes equal exposure throughout all habitats, which could conceivably increase exposure assessment several fold.

On page 6-198 a sentence appears related to toxicity in sediments. How does a comparison to "...off-site sediment concentrations..." answer the question that hyallela toxicity tests are designed to do?

DESIGN:

We suggest the following for inclusion in the Design Phase.

- Incorporation of a more precise chemical analysis method than that used in the RI phase. This would be a method that has the lowest detection limits possible, but certainly below those levels below known biological impact levels.

- Identification and characterization of seeps along the outcrops above the unnamed tributary. Along with this, a complete and thorough pathway identification should be carried out.

- The design phase include sufficient habitat characterization and reference area comparisons to place remediation on sound footing. We cannot determine at this point the extent to which remediation should be carried out. Neither the Draft RI nor the Final sheds sufficient light to make a decision either for extensive or limited remediation. It is in their best interest as well as ours to complete this portion of the RI.y

Thank you for the opportunity to comment and if you have any questions please do not hesitate to contact me.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
841 Chestnut Building
Philadelphia, Pennsylvania 19107

DATE: FEB 11 1992

SUBJECT: Standard Chloride: Draft Remedial Investigation

FROM: Robert S. Davis, Coordinator (3HW15)
Biological Technical Advisory Group

TO: Robert Guarni, RPM (3HW25)
Delaware/Maryland Section

The BTAG has reviewed the Draft Remedial Investigation report. The following comments are offered on behalf of EPA, the USFWS, and NOAA.

Ecological and Receptor Characterization:

The site has not been as thoroughly characterized for habitat values as it should be. The investigator should delineate the various habitats along with the very acceptable wetlands characterization provided.

This information will be helpful in developing a receptor scenario. Although the tide gate has drastically changed the fish population picture, little information was provided that gives a clear perspective of past conditions. These changes are a direct result of the spill and should be acknowledged.

At least two issues are raised with regard to fish: 1) installation of the tide gate resulted in loss of the anadromous fishery, an ecological impact that will likely be raised during negotiation with the natural resource trustee agencies regarding the covenant not to sue. 2) collection of fish for tissue sampling was successful on only one event and then showed rather high levels of contaminant, but not as high as might be expected in light of the levels identified in water and sediment. In addition, the fish represent a stage in the food chain that may be impacted by insects ingested and, in turn, impact fish eating birds.

The site is part of the feeding ground of a highly regarded Great Blue Heron rookery that is located on Pea patch Island in the Delaware Bay. Appendix H correctly states that insects comprise a large portion of the great blue heron diet. However. the Risk Assessment (pp 6-173ff) fails to include this. In fact, the characterization of fauna and receptors fails to include insects at all, a surprising development in light of the fact that the

The investigators have selected the white tailed deer and the Great Blue Heron as the main receptor species. This selection is difficult to understand other than each is at or near the top of their respective food chains. In the case of the Great Blue Heron, they would find a need to follow the pathway of fish, insect, small mammals, amphibians, and perhaps reptiles. Other birds that may use the habitat should be identified and appropriate food chains described. It is difficult to understand why the white tailed deer were selected. The investigation failed to mention the several small mammals, amphibians, birds and soil organisms that are certainly found at the site. In our opinion, moles, voles, frogs or some other less broad ranging species than the deer would have been preferred. Another resident herbivore conspicuous by its absence is the musk rat, an amphibious mammal that spends 90% of its time in contact with water. The rabbit population should also be included.

This list is not exhaustive and the investigator should be encouraged to consult with fish and wildlife experts at the state and local level to complete a food chain and receptor survey that is representative of the area.

In addition, the conclusions reached on white tailed deer and Great Blue Heron are based upon calculations only and not on any field data apparently. It is suggested that both the deer and great blue heron as well as other representative species of the habitat be collected and examined for impacts to selected metaboloc systems.

Extent of Contamination:

The questions surrounding this issue are confusing, especially in light of the proximity of the RCRA waste site adjacent that has accepted wastes from the site. However, the cause of both RCRA and SF can be served by combining the efforts as you described. It is noticed, however, that the estuary was not included in the study as far as we can tell. Presumably, the investigator made the determination that the tide gate installed directly after the original spill has cut off any contamination to the Delaware.

There is no assurance that this is the case. Tidal gates are not perfectly sealed, as a general case, although they do inhibit flow very efficiently. It is suggested also that ground water flows may carry product into the Bay, even though the initial evidence indicates that the upper aquifer, (columbia) discharges into the Red Lion Creek. Additional information should be provided on lower aquifers to ascertain the potential for off site migration, especially to the Bay.

The extent of contamination should also include past activities with regard to both the impacts to the ecosystem as well as to the limits of clean up achieved.

Chemical Characterization:

Data in the RI have qualifiers, including entries that are below detection limits and rejected analytical data. Volume I does not explain why a value of 160,000 ug/l of 1,4-dichlorobenzene in Red Lion Creek is below detection limits nor how such qualifiers impact data used in analyses. Variability may be due to either an inadequate sample size or to matrix interference. When data bearing these qualifiers is deleted from the tables (deleted presumably because quality control is unacceptable), it appears that too little information would be available for risk assessment.

This situation also has implications for the extent of contamination and ultimately for the boundaries of the clean up/remediation. It will be very difficult to draw a line in light of the proximity of this site to the RCRA site on the adjoining property. However, the unqualified data will complicate this issue even further, since it is associated with sediment which has the propensity to move with the gradient.

In addition, the presence of Tybouts Corner, another SF site, makes if very difficult to establish a boundary for this site. The Tybouts Corner site complicates the problem of making distinctions among different sources.

Toxicity Testing:

The bioassay results for all organisms tested showed the expected impacts. Toxic impacts were reported for lettuce seed, earthworms, and Hyallela azteca. However, the ecological assessment fails to fully acknowledge the data in the conclusions (p 7-14). Earthworms are a major doorway into the food chain to higher organisms in the chain via such predators as the shrew, yet no information is provided with regard to these or to others. In addition, the potential for adverse effects upon terrestrial vegetation and soil fauna is acknowledged, but the investigation did not include a fish toxicity test, thus conclusions regarding these organisms are sparse and limited to those species collected for tissue analyses. We should have specified the fathead toxicity test; this may still be a consideration after discussions with the BTAG members and the RPM.

General:

Please note that some of the following comments appear as implied conclusions and recommendations in addition to those in the conclusions and recommendations section, below.

On page 5-6 (Table 5-1) lists fish found at the site, but this does not agree with Table 6-69, page 6-151, representing a list of wildlife species observed or expected to be found at the site.

On page 6-23, it appears that a single fish was used in the anal-

ysis. Drawing any conclusions from this data is inappropriate, since statistical analyses cannot be carried out on a single organism or event.

On page 6-150 it is stated that some work regarding identification of endangered species has been done. It is important to provide documentation or a citation demonstrating that this has been done.

On page 6-163 mention is made regarding deer intake of chemicals and the text refers to tables 6-42 and 6-43. These tables are part of the human risk assessment. The appropriate tables are 6-72 and 6-7

The text discusses the daily foraging percentages for deer and the Great Blue Heron without any mention of the basis for the assumptions.

The discussion on page 6-187 states that the potential for harm is unknown, but it cannot be assumed to be of lesser importance as the text implies. This is a generality based upon calculations only that have been in turn based upon several assumptions, many of which can probably be questioned. For example, it seems to us that the Critical Toxicity Value for the ingestion route is a difficult number to justify scientifically. How did they arrive at this figure? Is a literature citation available that can be referenced or was the calculation carried prior in the document and missed on our review?

The summary table on page 6-194 compares data from the bioassay using Hyallela azeteca with Appendix J. However, it appears that the investigator did not match the two sources with regard to mean percent survival. The mean length numbers also differ. Unless this is merely a typographical or mathematical error, problems with the toxicity tests may be the cause.

Conclusions and Recommendations:

Data gaps exist in all the areas mentioned above: the extent of contamination has not been completely delineated with regard for surface, ground water and air. Transport and fate should be linked to these as well as to the ecological receptors. The receptor survey is seriously flawed by considering only one species of bird and mammal and ignoring whole orders of populations such as the insecta. The fisheries resources are probably so drastically changed by the tide gate that the original population is long since gone. However, the fishery resource should play a large role in the damage assessment.

Perhaps the Site Investigation Section could take another look at the delisted site adjacent to Standard Chlorine to see if it can be re-listed in light of the ecological ramifications.

Conclusion: The ecological characterization has not been thoroughly carried out. A very thorough wetlands delineation appears to have been done, but the other habitat areas received insufficient attention. The investigators failed to identify control or reference areas where little if any impacts from the site are found.

Recommendation: The habitat characterization should check off which ones are present as well as those which do not appear to be found at this location. For example, it would not be unusual to discover that terrestrial habitat values are absent, although from the reading it does appear that some terrestrial habitat can be found at the site.

Recommendation: The investigator should locate reference areas and sampling stations in the general area that are relatively free from extensive ecological damage and which do not have any contamination associated with the site.

Conclusion: The extent of contamination associated with the site is obviously difficult to do with regard to boundaries due to the upstream SF site and the RCRA site adjoining it.

Recommendation: Either a continued effort to coordinate activities at all these sites should be made of the adjacent site should be re-listed. It is obvious that some arbitrary decision will have to be made, but that should be made with an eye towards an acceptable rationale, as it may impact ecological values. The boundaries should reflect a strong ecological influence. It is important to remember that biology/ecology do not respect political boundaries or property lines.

Conclusion: Toxicity tests show that several test organisms are adversely affected, but no link was made to receptors in the ecosystem.

Recommendation: the ecological characterization should be completed for all trophic levels at the site and an assessment completed for food chain impacts. The investigator should select indicator organisms for select habitats and evaluate relative impacts. For example, the endocrine and liver systems are of concern that may be considered for examination across several species. The investigator should consult with appropriate experts and develop a systematic study to assure that the conclusions in Section 7.7.2 are correct and complete. It is our opinion that they are not sufficiently broad to cover the concerns of the BTAG.

Conclusion: the target organisms selected (deer and Great Blue Heron are not the best species to select for ecological risk assessment.

Recommendation: target organinsm should be selected from those known to nest an forage on-site and from a variety of habitats.

Food chain implications should also play an important role in this selection. For example; the shrew is voracious and demonstrates a varied diet. This might be a desirable organism to select.

Recommendation: Elsewhere in this comment memo species missing from the characterization are mentioned. The investigator should consider including representatives of the insects found at the site as well as small mammals, amphibians, reptiles, migratory birds, etc. This is not an exhaustive list, but rather merely a point of departure. Indicator data such as density, diversity, and abundance are basic to such a chracterization and this may be enhanced with biomass estimates if possible.

Conclusion: It is not assured by the document that transport and fate has been thoroughly studied. Along with the potential for surface and ground water mobility, the air pathway does not seem to have received much more attention than mentioning. In conjunction with this is the potential for impacts from the various breakdown products of the contaminants.

The AQUIRE Data Base contains data that suggest unacceptable adverse effects due to dichlorobenzene, trichlorobenzene, and tetrachlorobenzene. The AQUIRE Data Base for some of the contaminants of concern indicates that their levels are so high that no safety factor exists for protection of fish and macroinvertebrates.

Neither the white tailed deer nor the Great Blue Heron are considered to be the most desirable target organisms for study. The deer may range over a wider area than that represented by the site. The deer browse has not been demonstrated to be an important pathway. The Great Blue Heron, as a incidental visitor to the site, very likely uses other areas in its forage habits and thus may not be as fully exposed to contaminants than another species that nests and forages on-site.

Recommendation:It is suggested that the investigators complete the receptor characterization by starting from the perspective of the food chain and habitat characterization.

Recommendation: The investigators should find reference areas to be used for ecological comparisons in the ecological risk analysis.

Recommendation: the investigator should revisit the ecological risk assessment and re-evaluate on the basis of more conservative figures, on a wide variety of organisms found on site and that are permanent inhabitants or localized migratory species.

Thank you for the opportunity to offer these comments and if you have any questions please feel free to call me on 3155.

(This revisedmemo is forwarded to replace that of January 8, 1992

AR307684

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region III
841 Chestnut Building
Philadelphia, PA 19107

SUBJECT: Standard Chlorine (DE)

DATE: February 6, 1992

FROM: Robert S. Davis (3HW15)
BTAG Coordinator

TO: Bob Guarni, Project Manager (3HW25)
Standard Chlorine Site

The attached items have been identified by the US Fish and Wildlife Service as areas of concern associated with the quality of data. You may wish to consult with quality assurance reviewers regarding these items.

If you have any questions concerning this, please contact me at 215/597-3155.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
DIVISION OF ECOLOGICAL SERVICES
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ANNAPOLIS, MARYLAND 21401

February 3, 1992

H. Ronald Preston, PhD
Region III - Environmental Sciences Coordinator
USERA - Environmental Services Division
303 Methodist Building
Wheeling, WV 26003

RE: Standard Chlorine - Quality Assurance Review, January 1992

Dear Dr. Preston:

The U.S. Fish and Wildlife Service (Service) has reviewed the subject Quality Assurance Review (QAR) for the Biological Technical Assistance Group (BTAG) and offers the following comments:

STANDARD CHLORINE GC VOA (71 SAMPLES):

- A page appears to have been removed from the subject report. This page should preceed page 1 (Overview).
- Page 1, last paragraph: The evaluator needs to be identified along with the rationale for the recommendation for the "...± 40% QC limits for the a,a,a-Trifluorotoluene surrogate compound." Use of a surrogate compound needs to be described.
- Page ?, Information Regarding Data: In order for our review to be complete, we will need to review the Standard Chlorine QAPP
- Data summary for this section does not contain any units designation. Inclusion of units (mg/L, µg/L, etc.) is necessary for correct interpretation of data.
- Page of Glossary Data Qualifiers: The same definition is being used with letters "B" and "U". Confusion will be minimized if this definition is associated with only one of these letters.

STANDARD CHLORINE GC VOA (67 SAMPLES):

- Page 1, paragraph 6: Which compounds were not comparable to the duplicate results? Does the "...lack of established QC criteria..." mean that the QAPP is limited?

- Page 1, paragraph 7: Terms like "...fair..." and "...good..." are used to describe data. What do these terms mean? Are they defined in the QAPP? What does "...s bias..." mean?

- Attachment II, Data Summary: Data in this summary do not have any units defined. Units need to be provided.

ORGANIC QUALITY ASSURANCE REVIEW: CASE 9109L610:

- Page 1, paragraph 4: The first sentence is missing a phrase after the word "...meet...."

- Page 3, paragraph 3: What does "...CRQL..." mean?

- Page 3, paragraph 5: Because the statement is made that a particular analysis was not performed, an explanation needs to be provided.

INORGANIC QUALITY ASSURANCE REVIEW: CASE 9109L610:

- Page 1, paragraph 4: What does "...IDL..." mean?

- Page 1, paragraph 8: Data obtained for sample SDT-3D is unacceptable.

- Page 3, Comments: Based on the comments as listed, the Service believes that dirty laboratory technique(s), poor control sample performance, and poor precision are reflected in these data. This supports the contention that some (much) of these data are questionable.

- Page 4, Information Regarding Data: EPAs functional guidelines (and any other guidelines) that were used to review these data (or any other data) need to be outlined and discussed. In addition, the Standard Chlorine QAPP needs to be included for review by BTAG.

ORGANIC QUALITY ASSURANCE REVIEW: FISH BATCH # 9107G514:

- Page 2, General Comments: The Service believes that any problems associated with the exceedence of holding times, and the application of soil sample criteria to fish samples will be explained in the QAPP; a copy of which will be provided to BTAG for review.

- Page 3, paragraph 5: The rationale for rejecting data instead of labelling it "U", "UJ" etc is presumed to be explained in the QAPP.

- Page 3, paragraph 7: Definitions for %RSD and %D (as well as other acronyms) need to be included.

- Page 4, paragraph 5: The first sentence is unclear ("...tune...?" and the verb is missing).

- Page 5, paragraph 1: "...RPDs..." means? Second sentence is gramatically incorrect.

- Page 5, paragraph 2: "...RSD..." and "...RRFs..." mean?

- Page 5, paragraph 3: Does a 2 fold dilution equal a dilution of ½? The "...biased..." nature of the results needs to be explained, especially in light of the purely mathamatical manipulation involved.

In general, while review of this QAR has generated a number of questions, the position of the Service in our January 16, 1992 review of the Remedial Investigation (RI) has been supported. A significant number of these data from the RI are not accurate and should be deleted from consideration. Once these data have been deleted, data gaps appear making it difficult, if not impossible, to render a baseline risk assessment, interpret data, or render meaningful conclusions/recommendations.

The Service appreciates the opportunity to review this document. If you have any questions, please contact Peter Knight at (410) 269-5448.

Sincerely,

John P. Wolflin
Supervisor
Annapolis Field Office

cc: Robert Davis (3HW15), Region III, Environmental Protection Agency